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Priebe, A.; Rathkjen, P. H.; Larsen, Lars Erik; Kvisgaard, Lise Kirstine; Hjulsager, Charlotte Kristiane; Angulo, J.; Havn, K.

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PRRSV TYPE 1 DETECTION IN AEROSOLS INSIDE A PRRSV-POSITIVE SWINE HERD IN DENMARK, A COMPARISON ANALYSIS OF AIR SAMPLING VS BLOOD SAMPLING

Priebe A.[1], Rathkjen P.[2], Larsen L.E.[3], Kvisgaard L.K.[3], Hjulsager C.K.[3], Angulo J.[4], Havn K.[5]
[1]Technical University of Denmark ~ Haderslev ~ Denmark, [2]Boehringer Ingelheim, Denmark ~ Copenhagen ~ Denmark, [3]The National Veterinary Institute, Denmark ~ Copenhagen ~ Denmark, [4]Boehringer Ingelheim, Germany ~ Ingelheim ~ Germany, [5]Svinevet Pig Practise, Denmark ~ Haderslev ~ Denmark

PRRS is one of the most important diseases in Danish swine and has a significant impact on the production economics, antibiotic consumption and animal welfare. Approximately 40 % of Danish swineherds are positive for PRRSV type 1 or/and type 2. Air borne transmission via aerosols has previously been described for PRRS type 2 viruses, but there have been no reports of aerosol transmission of genotype 1 PRRSV under field conditions. This aim of the study was to test if PRRSV could be detected in the air collected inside a PRRSV-positive swine herd in Denmark. The results of test of air samples were compared with test of blood samples from pigs in the same section/pen.

Case description
The case herd was a PRRSV-positive wean-to-finisher herd. High IMPA antibody titres to PRRSV type 2 were found in the pigs prior to the study, indicating possible shedding of PRRSV. A mass vaccination (sows, gilts, boars and piglets from 1 week and up to 30 kg) using Ingelvac®PRRSV MLV was conducted prior the study, because of an acute outbreak of PRRSV in the sow herd. All pigs entering the herd were thereafter vaccinated with Ingelvac®MLV.

Materials and methods
A liquid cyclonic collector (Midwest MicroTek, Brookings, SD, USA) was placed inside the herd in the middle of each room, 50 cm from the ground. Air was collected in the cyclone for 30 minutes. During this period the air was centrifuged into a collection bowl, where 10 mL of PBS was added. If present, PRRSV was captured in the buffer. Air and blood samples were collected weekly for a period of 10 weeks from 3 groups of pigs: pigs 14 weeks, non-vaccinated (Gr. 1), pigs 13 weeks (Gr. 2) and pigs at end nursery, 10 weeks (Gr.3). The samples were subsequently tested for PRRSV by a specific real time RT-PCR assay. ORF5 of selected samples was sequenced.

Results and discussion
Twice as many air samples compared with blood samples were PRRSV positive in Gr. 1 and Gr. 2. All positive results from air- (6/9) and blood (8/8) at Gr. 3 were PRRSV type 2. Ct-values of the air samples were significantly higher ($p=0.0003$) compared to the Ct-values in the blood samples indicating, that only a low amount of virus was shed in the air.
No significantly difference ($p=0.683$) was found between air and blood samples in detecting PRRSV, indicating that the cyclone was an effective tool for detection of PRRSV within a section. PRRSV in all 8 air and blood samples tested showed high nucleotide sequence homology to vaccine strain in ORF5 (98.51-99.83%).
In conclusion, collection and test of air samples were as sensitive as blood samples for detection of PRRSV inside a PRRSV-positive herd.